U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

December 2023 Supplementary Examinations

Programme: B.E. **Semester: I / II**
Branch: ECE/EE **Duration: 3 hrs.**
Course Code: 22CY1BSCEE / 22CY2BSCEE **Max Marks: 100**
Course: Applied Chemistry for Electrical Engineering Stream

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	*CO*	*PO*	Marks
1	a)		What is electroless plating? Explain the electroless plating of copper for manufacturing PCB.	*CO1*	*PO1*	**8**
	b)		Discuss the effect of (a) Nature of corrosion product, (b)Relative cathodic and anodic areas, and (c)Temperature on rate of corrosion.	*CO2*	*PO2*	**7**
	c)		A cell is constructed by using two iron electrodes in contact with 1M and 0.02M acidic ferrous ammonium sulphate solutions in water *at 25°C*. Write cell representation and cell reactions, calculate EMF of the cell.	*CO2*	*PO2*	**5**
			OR			
2	a)		Identify and explain, with appropriate reactions, the types of corrosion in following cases; (a) Iron object is in contact with copper (b) Corrosion inside steam generation boilers.	*CO2*	*PO2*	**8**
	b)		What are secondary reference electrodes? Explain the construction and working of calomel electrode.	*CO1*	*PO1*	**6**
	c)		What is passivation? Explain the process of anodizing of aluminum with relevant reactions.	*CO1*	*PO1*	**6**
			UNIT - II			
3	a)		Differentiate between GCV and NCV. In bomb calorimeter experiment, 1.4 g of glucose ($C_6H_{12}O_6$) sample was completely burnt. The temperature of surrounding 1.9 kg water was elevated by 2.5°C. The water equivalent of calorimeter is 0.35 kg, specific heat of water 4.187 $kJ/kg^{-1}K^{-1}$, and latent heat of condensation of steam is 2454 $kJkg^{-1}$. Calculate GCV and NCV of glucose fuel.	*CO2*	*PO2*	**7**
	b)		Discuss the fluidized-bed catalytic cracking process. Mention any two advantages of the process.	*CO1*	*PO1*	**7**
	c)		Elaborate on the construction and working of silicon-based PV cell. How it is different form QDSSC?	*CO1, 2*	*PO1,2*	**6**

			UNIT - III			
	4	a)	Discuss the synthesis and applications of PMMA and butyl rubber.	*CO1*	*PO1*	**7**
		b)	A polymer sample having 100 molecules of molecular weight 10000, and another 200 molecules of molecular weight 12000. Calculate number and weight average molecular weights, and PDI. To the above sample, 100 molecules of molecular weight 20000 is added. What happens to PDI. ?	*CO2*	*PO2*	**7**
		c)	Elaborate the structure-property relationship of a polymer with respect to ; (a) Tensile strength and, (b) Chemical reactivity.	*CO2*	*PO2*	**6**
			OR			
	5	a)	Discuss the synthesis and conducting mechanism of polyacetylene.	*CO1, 3*	*PO1,7*	**7**
		b)	What is glass transition temperature (Tg) of a polymer? Elaborate the effect of ; (a) Cross linking, (b) Average molecular weight on Tg.	*CO2*	*PO2*	**7**
		c)	Justify that polymer composites are superior structural material. Explain the synthesis of Kevlar fibres.	*CO3*	*PO7*	**6**
			UNIT - IV			
	6	a)	With the help of a Jablonski diagram differentiate between fluorescence and phosphorescence. What are non-radiative transitions?	*CO1*	*PO1*	**7**
		b)	Explain the classification of solids using band theory with suitable examples.	*CO1*	*PO1*	**7**
		c)	What are liquid crystals? Discuss the classification and applications of liquid crystals.	*CO1*	*PO1*	**6**
			UNIT - V			
	7	a)	What are the effects of e-waste on human health? Discuss the process of extraction of copper from e-waste by hydrometallurgical process.	*CO1, 3*	*PO1,7*	**8**
		b)	Discuss the synthesis of nano-TiO_2 by sol-gel method.	*CO1*	*PO1*	**6**
		c)	Explain the working principle of NO_x sensors.	*CO1, 3*	*PO1,7*	**6**

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